

Utah's Strategic Information Technology Plan

“Making IT Happen!”

Version 1.02

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Introduction

Making IT Happen!, Utah's state strategic plan for information technology, provides a high-level road map for the use, management, and development of information technology resources in state government. The plan offers an overall purpose and mission for information technology in the state as defined by five broad guiding principles. The plan outlines a blueprint for the continued deployment of information technology resources in the state through a set strategic goals and objectives. The strategic goals are further defined by a set of measurable methods and strategies for achieving each of the broader objectives.

In 1993, through the creation of the "Electronic Highway" task force, Governor Michael Leavitt set forth his vision for moving Utah State government on-line. He also outlined several principles for managing information technology as a strategic state asset. In those principles the Governor emphasized that for information to be useful and valuable to the citizen, and to state workers, it must be easy to access, cost-effectively managed, customer-driven, private, secure and shared.

This strategic information technology plan takes stock of how far we have come in realizing Governor Leavitt's original vision and what it will take to turn the remaining elements of that vision into reality. A team of Cabinet members was given the responsibility and authority to develop a strategic information technology plan for the State of Utah. The State's Chief Information Officer (CIO) was designated to gather input and assume lead responsibility for the plan's development.

Utah's Strategic Information Technology Plan calls for a closer integration of government information and services. It recognizes the need to focus on Year 2000 issues, moving government services and information on-line, and providing the most effective organization structure and processes for IT within the state organization. We expect that many of the benefits outlined in the plan's mission and purpose will be achieved over the next several years. A common sense of purpose and shared understanding of focus and priorities is essential to accomplishing the plan's strategic goals. We anticipate, as the goals of the plan are achieved, that our citizen customers will be the direct beneficiaries.

Information technology, if used in a well planned and executed way, holds great promise to re-form, redirect and revitalize, while inspiring a sense of public confidence and trust in our government. This document reviews "where we are", defines "where we are going" and outlines strategies for "how to get there."

What's in the Plan?

Utah's Information Technology Strategic Plan first lays out some basic assumptions and values which will drive the State's information technology planning efforts into the next century. Flowing from these core values are a set of guiding principles which define the mission and purpose of information technology in our state government. These principles then guide the creation of a set of strategic goals—some of which are stated broadly and some of which are more specific. This is based to some extent on their priority and the sense of urgency which is driving their implementation. Specific strategies have been outlined for each of the goals, as well as a set of benchmarks to gauge our progress towards the

accomplishment of that goal. The extent of the detail will vary as we move forward. This plan, particularly in its digital or electronic form, is intended to be a “living document”-- continuously updated to reflect changing needs and environment.

The plan also outlines the current technology environment in the state, defining current state strengths and weaknesses, and offering an analysis of current trends in information technology. It is the intent of this plan that this “snapshot” view of the technology landscape and the state’s current efforts toward effective and efficient deployment of information technology resources be updated on a regular basis.

Key to the process of developing the strategic plan was an effort to include input from senior executives throughout state agencies, leadership from both the legislature and executive branch, IT management and planners at several levels, users of the state’s information systems, and the general public and private sector industry. Summaries of that input have been included with the plan to help underscore some of the issues and concerns that are being addressed.

In its online version (www.governor.state.ut.us/cio/uploads/itplanning.htm), this document contains links to expanded information, specific proposals for initiatives, and reference material that will provide guidance in making smart information technology choices.

Information Technology: Enabling Better Government

The State of Utah has been recognized nationally as a leader in the innovative use and deployment of information technology resources. A commitment to shared infrastructure, talented information technology professionals, and leadership and vision from the state’s senior executives have all contributed to past successes. At the same time, the expectations of citizen-customers have continued to increase. Government agencies are being asked to improve service, provide greater flexibility and responsiveness, and serve a larger and fast-growing constituency. Government leaders and the public expect to see decreased costs from the deployment and use of information technology resources.

Adding to the challenge, information technologies are continuing to undergo rapid and profound change. Oftentimes state-of-the-art technology which an agency has purchased may become obsolete or antiquated long before the end of its anticipated useful life. As technology changes, the ability for information technology systems from different departments to interact and work as a cohesive whole is compromised.

Meeting the challenge of providing improved service and increased efficiencies in government will require that agencies work together cooperatively, minimize duplication of efforts, increase their sharing of common information technology resources, and foster innovation in the application and deployment of information technology. This plan sets forth the guiding principles and strategic goals that will help the State of Utah meet those challenges. We invite you to accompany us on the journey and hope it will be well worth your effort!

Values Driven Technology Planning

The following values help shape this strategic plan, and provide guidance in the use of information technology in the state:

- ▶ The Governor, the State and its citizens **embrace the use** of information technology (IT) to improve the quality of life for all citizens;
- ▶ State government must provide **reasonable access** to all information which is not classified, and provide processes for individuals and agencies to verify information and correct errors if necessary;
- ▶ IT initiatives must remain **customer focused** and deliver useful, accurate, and timely information and services to those need it;
- ▶ IT decisions must be **cost effective**, and should be evaluated based on cost-benefit analysis, consistent criteria for evaluation, adequate consideration of alternatives, and an identification of needs;
- ▶ IT infrastructure must provide **universal access** to government information and services through reduction of social, economic, and ability barriers, recognizing that citizen awareness and education is crucial to all universal access efforts;
- ▶ IT must be viewed as a **strategic asset**, and should play a key role in re-engineering government processes to increase efficiency and effectiveness;
- ▶ Information technology resources must help to **multiply knowledge**, streamline service, facilitate communications, and provide management information to all knowledge workers throughout the organization.
- ▶ State government encourages **innovation** in the application of information technology.
- ▶ Information must be adequately **secure** and protected to ensure its confidentiality, integrity, and availability, and to prevent, detect, and minimize loss from intentional or accidental hazards.
- ▶ Information and information technology resources must be **shared** where possible, and support an environment of cooperation and collaboration, including the sharing of ideas, resources, and data within and between agencies-- unnecessary duplication of information and effort should be eliminated;
- ▶ IT planning efforts must be **strategically aligned** with the Governor's key objectives, departmental business goals, the Governor's Office of Planning and Budget's planning initiatives and the Utah Tomorrow strategic planning process of the Utah State Legislature.

Strategic Planning in the State of Utah

Critical to the strategic planning process for information technology is a recognition of the broader strategic vision and goals for the state of Utah. Included here as a framework within which the strategic goals for information technology fit, are the vision, goals, and objectives for the state as a whole.

Utah Tomorrow is the officially recognized strategic plan and strategic planning process for the state of Utah. It defines the following vision statement for Utah:

We the people of Utah, stand at the edge of a new frontier. In a world of rapid economic, social, environmental, and technological change, we confront bold challenges and rich opportunities.

Building upon our diverse cultures, our pioneering spirit, and our belief in the inherent worth of every person, we seek to:

NURTURE a tolerant, just, and compassionate society that honors integrity, values strong families, welcomes diversity, and promotes positive values.

EDUCATE our citizens by providing an environment that supports life-long learning and occupational skills and that enables Utahns of all ages to reach their potential as productive and responsible individuals.

BUILD a statewide economy and infrastructure that supports a broad spectrum of opportunity for all citizens while advancing the standard of living and maintaining a high quality of life.

ENHANCE our local and global environment through prudent development, conservation, and preservation of our natural resources while protecting public health, and preserve our sustainable food and fiber resources.

PROMOTE personal well-being by encouraging healthy lifestyles and disease prevention, and by supporting access to quality health care at an affordable cost for all Utahns.

UNDERSTAND our diverse human heritage, nurture and protect Utah's cultural resources, and create opportunities for cultural education and expression.

ENCOURAGE self-sufficiency while helping those with special needs to lead productive, fulfilling lives.

PROTECT our society by supporting a justice system that allows Utahns to enjoy a quality lifestyle consistent with the rights and liberties guaranteed under the United States and Utah Constitutions.

ASSURE open, just, and accountable government.

STRENGTHEN our free enterprise system while providing a reasonable regulatory environment that protects our citizens.

PREPARE ourselves, our state, and our children for the challenges of tomorrow, today.

Also important are the business goals that have been continually emphasized by Governor Michael O. Leavitt during his administration:

- Providing world-class education
- Creating quality jobs and a quality business environment
- Improving government services
- Enhancing the quality of life for all Utahns
- Fostering self reliance, and
- Protecting Utah's foundation of community values.

The Governor has also added as long range goals for the state, to:

- Slow the investment in bricks and mortar;
- Refuel the resettlement of rural Utah;
- Use what we have better;
- Increase individual responsibility and community values;
- Become a generation of planners; and
- Make quality our comparative advantage.

As added input, **education, managing growth, fostering economic development** and **preparing for the Olympics** were highlighted as key areas needing focus and leadership during strategic planning sessions by the Governor and his senior staff in the spring of 1998. In addition, and specific to the area of information technology, adequate preparation and planning for the Year 2000 computer problem was identified as being extremely important to the economic well-being of our state in the next two years.

Mission and Purpose of Information Technology

The following “Guiding Principles” outline the mission and purpose of information technology in state government:

- ▶ *Use information technology to continually improve government efficiency and effectiveness.*
- ▶ *Increase access to information and services for both citizens and government employees, while protecting privacy and fostering openness in government.*
- ▶ *Use information technology as a catalyst to re-engineer current practices and design better ways of conducting the business of government.*
- ▶ *Contribute to economic growth and enhanced quality of life for all Utah citizens.*
- ▶ *Enhance the quality of education and promote life-long learning.*

Key Strategic Goals

The following have been identified, in order of priority, as the key strategic goals which should define the state's current focus and efforts in accomplishing the mission and purpose of information technology in state government.

1. **Year 2000 preparation.** Implement needed changes for Year 2000 problem, including work on interfaces, validation, and testing.
2. **Move government on-line.** Conduct the business of government electronically, leverage the Internet, and promote universal electronic access for all citizens.
3. **Become an integrated enterprise.** Maximize opportunities for coordination and integration of IT initiatives horizontally across agencies that serve common businesses or citizens.
4. **Manage and fund IT as a strategic investment.** Align budgeting and funding processes for information technology with state and departmental goals and priorities.
5. **Share data and IT resources.** Define state-wide architecture, technology, and data [standards](#) to enhance communication, collaboration, and the sharing of information and information technology resources.
6. **Have the right people.** Develop processes and essential practices for attracting, retaining, and providing life-long training opportunities for IT personnel.
7. **Eliminate organizational barriers.** Optimize information technology organization and management structure in the state and define clear roles and responsibilities for both centralized and decentralized IT personnel.

Strategies and Methods

This section of the strategic plan outlines those strategies and methods by which the key strategic goals and objectives will be accomplished. Associated with each goal are a set of benchmarks to be used in assessing progress in achieving the goal.

1.0 Goal 1 – Year 2000 Preparation. Implement needed changes for Year 2000 computer problem, including work on interfaces, validation, and testing.

This goal is considerably more “tactical” than the others, but because of the immense risk the state and its citizens face if we do not do all we can to prepare, it has been included here as the top strategic goal. Input from all levels clearly supports placing this objective as our top strategic goal for the coming year and a half. The following were established as strategies and procedures that should be implemented as quickly as possible to help us achieve this goal.

- 1.1 Require monthly electronic update to Year 2000 reporting site for central coordination on status of systems and risk assessment. Department senior executives need to make this a regular required report from their IT management.
- 1.2 Develop prioritized list of “must not fail” systems. If necessary, develop proposals for reallocation of funds to ensure that “must not fail” systems will be compliant.
- 1.3 Make approval for IT projects that are not Y2K related and their expenditures contingent upon Year 2000 compliancy (including testing) for each department’s IT systems.
- 1.4 Recommend department senior executives set proper expectations with regards to IT projects that are not Y2K related, and champion Y2K work.
- 1.5 Organize centralized team to work with individual agencies to review the status of their systems and ensure all the right questions have been asked and answered– focus on verification and validation.
 - 1.5.1 Hire two consultants/auditors full time for one year to help do verification and validation of state systems.
 - 1.5.2 Develop timetable for testing mission critical mainframe systems.
- 1.6 Require each agency to enumerate and validate interfaces between their systems and others. These interfaces are to be reported and tracked via the central Year 2000 reporting site.
- 1.7 Require each agency to develop a contingency plan for the period of time during which systems and infrastructure may experience problems.

- 1.8 Establish “Governor’s Coalition for Year 2000 Preparedness” to promote public awareness, increase communication between public and private sector entities with regard to the problem, and require accountability from businesses that are critical to the public infrastructure— public utilities, water/sewer, transportation, financial services, local government entities, public health organizations and hospitals. Help provide information to citizens and businesses to assist in their preparation and readiness to meet this challenge.

1.9 Benchmarks

- 1.9.1 All state information technology systems have been assessed, remediated, and tested for Year 2000 compliance.*
- 1.9.2 Appropriate contingency plans have been prepared at both the state and agency level to deal with potential system failures because of the millenium date change problem.*
- 1.9.3 Appropriate leadership is provided to citizens, public infrastructure providers, and businesses to deal with the Year 2000 computer problem.*
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2.0 Goal 2 -- Move government on-line. Conduct the business of government electronically, and promote universal electronic access for all citizens.

The dramatic changes taking place in technology and in the marketplace clearly point to a future where government at all levels will need to be able to conduct business electronically. Information and services will need to be available to the general public over the Internet and via telecommunications networks. State government will want to leverage the efficiencies offered by an electronic marketplace as it purchases goods and services from suppliers. Government must also continue to promote policies that will extend access to these services to all citizens.

The following key initiatives and recommendations have been identified as the “most important” for the state to pursue in order to achieve the above goal:

- 2.1 *Enable electronic commerce within state government.*
- 2.1.1 Organize an Electronic Commerce Council (ECC), with representation from Finance, Purchasing, ITS, Commerce, the CIO’s office, and state agencies, to:
- 2.1.2 Redesign purchasing and payment systems as needed to allow for electronic procurement, electronic bill presentment and electronic payments between state government and its suppliers.

- 2.1.3 Work with the Division of Purchasing, the Division of Finance, ITS, and state agencies to implement the technology and procedures necessary to allow the state to order, bill, and pay for goods and services electronically.
- 2.1.4 Establish on-line processes with respect to:
 - Vendor registration
 - Request For Proposals (RFPs)
 - Initiation of bid process
 - Request for Quotations
- 2.1.5 Establish an on-line “electronic procurement mall”, that brings together the state and its trading partners and allows state buyers to:
 - access to the latest information on supplier’s products
 - browse electronic catalogs from vendors or link to vendor web sites
 - compare product specifications on-line
 - order goods and services electronically
- 2.1.6 Implement on-line management and administration of contracts with suppliers.
- 2.1.7 Specify and coordinate the purchase or development of core service modules that would support electronic commerce applications by agencies (certification, digital signatures, payment systems, directories, EDI protocols, collaboration tools, etc.). Where significant capabilities already exist, such as electronic payment systems and electronic funds transfer, work to ensure they are accessible by all state electronic commerce applications.
- 2.1.8 Identify legal or legislative barriers to electronic commerce and the on-line delivery of services, and work to remove them.
- 2.2 *Establish a “Center for Government Services” to coordinate electronic access to services and information by citizens and businesses.* Utilize the resources of the Utah Access Enablers Group, the CIO’s office, and the Electronic Commerce Council to:
 - 2.2.1 Issue an RFP for the development of a “Center for Government Services” that will build and deploy a self-supporting gateway to on-line services and information from state government. This “single entry point” for on-line services and information on the web should also allow for future access to local government services.
 - 2.2.2 Organize access to state services and information and agency web sites in the most user-friendly and effective way possible. Coordinate with state agencies on core services, design guidelines, and applications as agencies begin to provide more information and services over the Internet.
 - 2.2.3 Coordinate with the Web Standards Team and the Information Technology

Policy and Strategy Committee (ITPSC) to establish standards, recommendations, and guidelines for all state web pages to ensure a common look-and-feel for the state's web presence, to provide consistent navigation and search capabilities, and to promote interoperability of web content and web development environments.

2.2.4 Identify opportunities for offering information and services to businesses and citizens electronically, solicit citizen and agency input, and conduct appropriate investment analysis, to prioritize which applications the state should focus on first.

2.2.5 Promote efforts to provide universal access to on-line services and information by strengthening appropriate library and school programs. Explore the idea of partnering with the private sector to implement "electronic service bureaus" to give citizens easy access to on-line government services and information.

2.3 *Build all future remote access applications using the Internet-- become a "net-centered" organization.* The following actions are recommended:

2.3.1 Implement needed technologies and core services to allow Internet-based applications for internal processes, including security services, web management, remote access, creation and fill-in of web-based forms, certification and authentication using digital signatures, and workflow. The Architecture and Standards Technical Advisory Group, together with ITS, should develop appropriate standards and implementation plans for these technologies.

2.3.2 Use the Internet as a communication vehicle, both internally and when communicating with the general public. Potential opportunities include conducting public forums over the Internet, taking employee and customer satisfaction surveys on-line, disseminating policies and procedures to employees and citizens over the Internet, and allowing electronic input to government committees and processes.

2.4. *Develop and deploy a self-supporting state employee web site, accessible via the state Intranet, with single-point access to services and information pertinent to state employees.* Use the resources of the Department of Human Resource Management, ITS, and the CIO's office to coordinate this initiative.

2.4.1 Implement an on-line gateway for state employees to access information and services, including on-line access to directories, organizational charts, policies, rules, and procedures; on-line training opportunities, forums or chat facilities for discussion or suggestions, on-line applications for time and attendance tracking, travel scheduling/approvals/reimbursements, benefit changes and enrollment, job postings and access to on-line employment services offered by DHRM; tracking employee information, and posting of current news and information for both the

state enterprise as a whole and also specific to a division or agency.

- 2.4.2 Evaluate funding the gateway by selling banner advertising space on the state employee Intranet, and make the “gateway” the default web page for state employee use of the Internet. Development of the web site and applications could be done internally or outsourced, depending on cost and control issues.
- 2.4.3 Determine and implement a state standard via the Architecture and Standards Technical Advisory Group for workflow, imaging and web-based forms.

2.5 Benchmarks

- 2.5.1 *Ordering, billing, purchasing, and paying for goods and services used by state government is done electronically and using network-based technologies wherever possible.*
- 2.5.2 *Electronic commerce technologies are leveraged to provide up-to-date, relevant, and actionable information to state government personnel about products, vendors, contracts, and solutions that they may need to conduct their business.*
- 2.5.3 *Citizens and businesses are able to easily access services and information provided by state government anytime, anywhere, using Internet technologies. All services and information that can reasonably be made accessible via these technologies are offered on-line.*
- 2.5.4 *State government provides a single, well-publicized, gateway to citizens and businesses for access to on-line services and information.*
- 2.5.5 *All web pages maintained by state government adhere to consistent standards of look-and-feel and provide consistent functionality.*
- 2.5.6 *Regular input is solicited by the state from citizens and businesses regarding the use of information technologies in their interaction with government.*
- 2.5.7 *The state has provided reasonable facilities and opportunities for all its citizens, regardless of where they live, to access on-line services, information, and educational resources.*
- 2.5.8 *The state has deployed network technologies necessary for moving internal processes on-line, including workflow, security, electronic forms, remote access, and document and image management technologies.*
- 2.5.9 *State employees are able to easily access up-to-date information and commonly used services on-line from their workplace or home, including directories, policies, rules and procedures, training opportunities, employment services,*

3.0 Goal 3 – Become an integrated enterprise. Maximize opportunities for coordination and integration of IT initiatives horizontally across agencies that serve common businesses or citizens.

High on the list of strategic priorities and directions for IT in the state is the goal of achieving better integration and coordination across agency and department boundaries. New programs for services tend to blur the boundaries between traditional government agencies, in some cases causing several agencies to be combined, or new agencies to be formed, in order to better serve the state's constituencies. IT systems increasingly need to be able to service needs across several departments. Data captured by one agency is often needed by several different IT systems in several different organizations in state government. Citizen-customers care more about the information they need or the service they are requesting than they do about which department or agency is "in charge" of a particular program. These needs require a willingness by state IT personnel to focus more on the needs of citizens, partners, and businesses, and increase the cooperation and coordination between agencies and departments in the deployment and use of IT systems. Current trends in technology (distributed systems, Internet applications, data consolidation, etc.) support the notion that data needs to be able to be shared across multiple applications.

The following have been identified specific strategies that should be implemented to help achieve this goal:

- 3.1 *Establish cross-agency coordination teams.* This will require identifying "affinity groups" of departments and agencies that provide services or information to common sets of individuals or organizations. Once identified, cross-agency teams should be created to direct the coordination of IT efforts among those agencies. These cross-agency teams would be responsible to:
 - 3.1.1 Seek direct user input from common "customer" groups that the agencies serve or provide information to. This user input could come in the form of interviews, surveys, and focus groups.
 - 3.1.2 Based on the user input, identify ways to simplify or streamline processes and procedures that cross agency boundaries.
 - 3.1.3 Identify data that is or could be shared across agency boundaries, and work with department and state data administration personnel to define standardized representations for people, organizations, assets, locations, and transactions in applications across the agencies.

- 3.1.4 Ensure appropriate peer agency review takes place in the design and development of IT systems within these affinity groups.
- 3.1.5 Identify IT personnel who could serve as shared resources among the agencies, decreasing the need to cultivate very specialized skills within each and every department. These “competency centers” should in some cases be shared resources across the entire state enterprise.
- 3.1.6 Promote joint development and integration of IT systems for these agencies.
- 3.1.7 *The following are examples of such agency groupings:*
 - 3.1.7.1 **Social Services:** Health, Human Services, and Workforce Services – welfare reform, medicaid eligibility, benefits disbursement, claims processing, and replacement of key welfare systems (such as PACMIS, GUIDE, UTES and their interfaces to SAFE and ORSIS).
 - 3.1.7.2 **Business Regulation and Support:** Tax Commission, Commerce, Workforce Services and the Department of Community and Economic Development – business registration, licensing, and tax procedures.
 - 3.1.7.3 **Law Enforcement/Criminal Justice:** Public Safety, Corrections, Courts, Human Services, Attorney General, CCJJ, Tax Commission, local law enforcement organizations, and law enforcement functions in the Department of Natural Resources– coordinating information access and procedures in the criminal justice area and law enforcement.
 - 3.1.7.4 **Motor Vehicle:** Department of Transportation, Commerce, Public Safety, Tax Commission, and county tax organizations– improve and coordinate procedures for motor vehicles, including the ITS/CVO project for streamlining regulation and monitoring of the trucking industry.
 - 3.1.7.5 **Digital Democracy:** Governor’s Office of Planning and Budget, Legislature, Elections Office, county commissions and local government executives – coordinate efforts to provide access to legislation, opportunities for greater participation in government processes by citizens, and on-line access to government officials.

3.2 Benchmarks

- 3.2.1 *Cross-agency coordination teams exist for groups of agencies serving common*

customers, and meet regularly to review information technology systems design for those agencies, gather and discuss user input, and seek ways to share IT resources more effectively across agencies.

3.2.2 Citizen and business input is regularly sought to identify ways of improving and streamlining government processes and services, and the input is discussed and reviewed by multi-agency coordination teams.

3.2.3 Standardized data representations and formats are defined and used by agencies in their data systems for identifying people, organizations, assets, locations, and transactions. When the same information is stored or collected by different data systems or by different agencies, it is identified and represented in the same way across systems.

4.0 Goal 4 – Manage and fund IT as a strategic investment. Align budgeting and funding processes for information technology with state and departmental goals and priorities.

It is important that the state establish procedures and practices that help to align budgeting and funding processes for IT with the goals and objectives of this strategic plan, departmental goals and objectives, and the priorities of the Governor, legislature, and senior department executives. The state's planned early implementation of new Governmental Accounting Standards Board (GASB) guidelines for treatment of IT related system development costs (capitalizing costs versus writing them off as expenses) will be an important factor in reinforcing these objectives. The following strategies have been identified as key to achieving this goal:

4.1 *Establish an IT investment management process.* Develop and use a consistent process for assessing the value of IT investments, evaluating their risks and returns, and for setting priorities for funding of IT projects.

4.1.1 The process should be used at both a departmental level for IT projects within that department, and at a statewide level for projects that cross agency boundaries or require statewide support and coordination. This plan should require that IT investments by a department be evaluated and ranked based on a consistent set of criteria.

4.1.2 Thresholds should be established indicating when IT projects should be evaluated on a statewide basis (high cost, high risk, impact on multiple agencies, etc.)

4.1.3 The process includes establishing performance measurement criteria early in the development process for IT projects to better assess and measure the benefits from IT investments. Performance results would be fed back into the IT decision-making process.

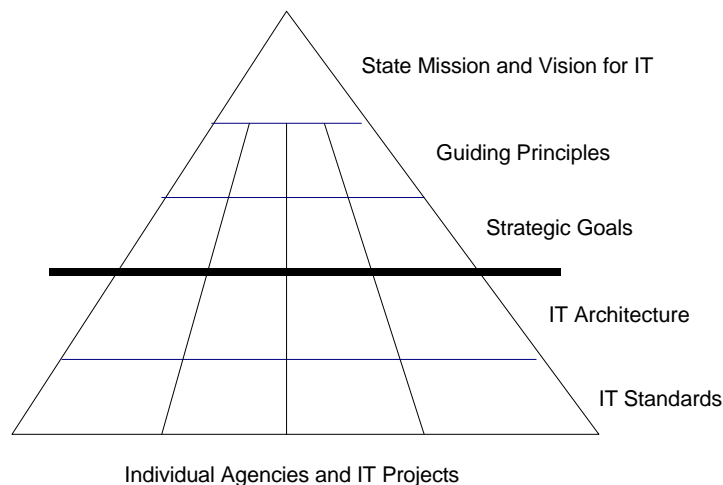
- 4.1.4 The specific “Select-Control-Evaluate” process that is proposed is described in the document “*Assessing Risks and Returns: A Guide for IT Investment Decision-Making*” and is referred to as the *Risk/Value Assessment Model (RVAM)*.
- 4.1.5 Implement more detailed and “project-based” tracking of IT expenses by the state’s financial system and budget and finance officers.
- 4.2 *Establish an IT innovation fund.* The purpose of the fund would be to promote creative uses of IT to increase government efficiency and effectiveness. It would act as a revolving loan fund, providing seed money for innovative projects that (1) will deliver specific measurable benefits to citizens, (2) can become self-sustaining within a reasonable period of time, and (3) can repay the money loaned from the fund via reduced budgetary expenditures or increased revenues in a reasonable period of time.
- 4.3 *Incorporate IT planning into normal departmental budgeting and planning processes.* IT projects should support the accomplishment of department business goals and objectives, and department program managers should be involved in the review and selection of IT projects each year as a normal part of their planning cycle.
- 4.4 *Continuously improve and update state strategic IT plan.* Make yearly updates to this state strategic IT planning document, and continuously seek input and direction to state IT goals and priorities.
 - 4.4.1 Establish procedures for ensuring department IT plans and projects are aligned with the priorities and goals established in the statewide plan.
 - 4.4.2 Require each department to annually submit a “report card” (self-assessment) that indicates their alignment with overall state strategic goals for IT.
- 4.3 Benchmarks**
 - 4.3.1 *A consistent information technology investment management process is used by all agencies to propose IT projects, assess their value, make decisions, and set priorities for funding.*
 - 4.3.2 *IT Investment Review Boards exist and function within each agency and at the state level for the purpose of managing the IT investment review process and to encourage budgeting and funding for IT that is aligned with departmental and state strategic goals.*
 - 4.3.3 *The IT investment management process is recognized by the legislature and the information provided by that process utilized by them in making funding decisions for IT for agencies and for statewide initiatives.*

- 4.3.4 *An IT innovation fund is established and provides on-going monies for investment in innovative projects to increase government efficiency and effectiveness through the use of information technologies.*
- 4.3.5 *The state strategic IT plan is update annually and departmental IT plans are aligned with the overall state strategic goals. Each agency is reviewed annually to determine how well their IT efforts are aligned with the state strategic plan.*
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5.0 Goal 5 -- Share data and IT resources. Define state-wide architecture, technology, and data standards to enhance communication, collaboration, and the sharing of information and information technology resources, and to provide information technology resources at the lowest possible cost.

Out of the overall mission, vision and strategic IT goals for the state must flow the requirements for an information technology architecture and set of standards. Individual agency IT projects need to be support and be consistent with both the enterprise goals and the IT architecture and standards. The following figure above illustrates this concept:

Framework for IT Strategy, Architecture and Standards



The following have been identified as key strategies for accomplishing this goal:

- 5.1 *Establish an Architecture and Standards Technical Advisory Group.* The general roles of this office would be to:
- 5.1.1 *Develop an architectural framework for state IT systems and technology standards and guidelines within that framework, under the direction of the CIO*

and the Information Technology Policy and Strategy Committee. This work would include developing a state network plan, statewide policies and direction for information security, and establishing standards for enterprise wide applications such as e-mail, document management, workflow, etc.

- 5.1.2 Act as a repository for state standards, architecture (e.g., information, data, applications, technology) and methodology for IT (e.g., software development, data definitions, network design). It would also record exceptions to defined standards.
- 5.1.3 Act as a governing mechanism to evaluate new developments for their applicability to state standards and architecture— serving as a brief checkpoint for evaluating both software and systems development in the state, infrastructure changes, and new technologies for appropriateness.
- 5.2 *Establish a statewide data administration function.* This function, located within the CIO's Office, would develop and coordinate common data definitions for persons, organizations, locations, assets, documents and also would create common data stores and data extraction tools where possible. The cross-agency teams discussed in Goal 3 would play a key role in helping to identify and define opportunities for shared data definitions.
- 5.3 *Establish a shared services organization.* This organization would identify and promote opportunities for sharing application code and core services across divisions and departments. Its function would include the responsibility to act as a "state code librarian", develop and maintain core application and network services for use by applications throughout the state enterprise, and foster a greater degree of communication among departments regarding opportunities to leverage applications and systems statewide. The shared services organization would help promote the establishment of "competency teams" to enhance the availability of specific IT skills to all agencies. In one sense, ITS currently already functions as a shared services organization, and it is possible that this function could be a subset of ITS. The intent is to increase the sharing of applications, tools, and network services across state organizations.
- 5.4 *Develop an integrated state network plan.* The Utah Telecommunications Coordinating Committee (UTCC), in conjunction with network planners from ITS, UEN, the Architecture and Standards Technical Advisory Group, and representatives from state agencies, should develop a statewide network plan, and processes for continual network planning, including statewide strategy and directions for state Intranet, web servers, high-speed Internet access, telecommunications facilities, remote access, wide-area network, Extranets, etc. Identify opportunities for UEN and ITS to extend and enhance the state's networking capabilities, in partnership with private telecommunications providers.

5.5 Benchmarks

- 5.5.1 *Where possible and allowed, information about people, organizations, assets, locations, and transactions is stored and accessed in a way that allows it to be shared across agencies and departments, without having to collect, store, and manage it in duplicate or redundant ways.*
- 5.5.2 *An architectural framework exists specifying appropriate IT architecture and standards for the state enterprise. Defined processes exist for establishing new standards, revising existing ones, and providing for exceptions when necessary.*
- 5.5.3 *A statewide network plan details strategy, policies, and opportunities for growth or change with regards to the state's wide area networks for voice, data, and video and other networking technologies.*
- 5.5.4 *Appropriate technology, policies and oversight functions are used to ensure secure, stable, robust, manageable, high performance connectivity between state government employees, customers, information technology resources, and needed information.*
- 5.5.5 *Core resources and services needed by multiple departments and agencies are managed and coordinated centrally, while preserving local control over information and applications needed to carry out their business goals.*

6.0 Goal 6 -- Have the right people. Develop processes and essential practices for attracting, retaining, and providing life-long training opportunities for IT personnel.

Several key recommendations have been developed in support this goal, and to provide help to IT managers in their efforts to hire and retain qualified IT workers:

- 6.1 *Seek additional funding from the legislature to be used to adjust IT compensation problems.* DHRM has identified that a block grant of \$900,000 in funding, to be used for either a one step increase for all IT positions, or at the discretion of executive directors to provide increases for higher performers and to address problem areas in IT compensation, would significantly improve range penetration by state IT workers.
- 6.1.2 *Work with the Information Technology Commission (ITC) to see if support can be generated for such funding.*
- 6.2 *Train non-IT workers who want to move to an IT position.* Use a portion of the funding above to identify non-IT state employees who have the desire and aptitude for work in IT, and provide training and opportunity for them to migrate to IT positions. This has

proved quite successful for some other states.

- 6.3 *Benchmark IT positions to the annual Radford Survey rather than the annual state salary survey conducted by DHRM.* Smaller companies than the state surveys tend to drive the market average downward, even though the state is a large employer and must compete with other large employers in the state. Using the Radford Group survey would make it more likely for IT workers to receive market comparison adjustments.
- 6.4 *Central coordination of IT training resources and opportunities.* Develop and use shared employee and information technology training materials and resources. Use strategies and technology from the State's distance learning efforts to enhance our IT training efforts across the state.
- 6.5 *Centrally coordinate hiring and management for some specialized IT skills.* Implementing centrally coordinated and managed "competency centers" for certain IT positions that are difficult to fill would:
 - 6.5.1 Allow those skills to be more effectively leveraged across the entire state enterprise.
 - 6.5.2 Encourage consistency in the management of salaries and bonuses for these IT positions, and potentially allow greater flexibility in keeping compensation for these skills competitive with the general market.
 - 6.5.3 Decrease the "job-hopping" that goes on between departments for these IT skills.
 - 6.5.4 Provide a more interesting range of job opportunities to prospective IT employees as they would have the opportunity to work for more than one department.
 - 6.5.5 Allow greater flexibility in "sharing" these scarce resources among several departments and projects.
 - 6.5.6 Focus our efforts on trying to attract and recruit for a particular IT skill set with a smaller group of individuals or managers. Rather than having multiple agencies all looking for that type of IT worker from time to time, we have one group constantly keeping a lookout for and recruiting for that type of skill.
- 6.6 *Accrual of leave time.* Suspend maximum allowed limits on accrual of leave time for IT personnel assigned to critical projects, such as Year 2000.
- 6.7 Benchmarks**
 - 6.7.1 *Senior department executives and IT managers have access to adequate funding and can utilize appropriately flexible procedures to hire and retain the needed*

personnel to deploy and maintain state information technology resources.

6.7.2 Internal training opportunities allow IT personnel access to the information and education they need to remain competent in their roles, and allow non-IT employees to learn and become competent in needed IT skills.

6.7.3 Appropriate balance is maintained between internal employee resources and external contract and consultant resources to efficiently and effectively deploy and use state information technology resources.

7.0 Goal 7 – Eliminate organizational barriers. Optimize information technology organization and management structure.

7.1 Conduct a formal program review of current IT organization and structure in the state. The purpose of this review would be to analyze, clarify, and re-define as necessary, IT organization structure and relationships, including relationships between CIO, ITS, UEN, and IT personnel in the agencies. Included in this review would be an attempt to answer the following questions:

7.1.1 What type of organizational structure will be most effective in achieving the goals of the state strategic IT plan?

7.1.2 Are current mechanisms for coordinating IT planning, management, and execution optimal? (i.e., the ITPSC, the ITPSC Executive Committee, the IT Commission, the CIO and staff, and other committees and groups involved in coordination of IT activities)

7.1.3 What activities and tasks are currently performed by ITS, and are these the correct activities and tasks that we wish to have performed by the state's centralized IS organization? What functions being performed by ITS or state agencies should be out-sourced or privatized?

7.1.4 What IT responsibilities should be centrally controlled, and which locally controlled?

7.1.5 Should there exist stronger ties between the CIO's office and IT management in the various agencies (i.e., should a portion of each IT manager's performance evaluation, as it relates to cross-agency initiatives and interagency communication, be made by the CIO)?

7.2 Benchmarks

- 7.2.1 *Central IS functions are regularly reviewed to ensure they are operating as efficiently and effectively as possible, and to explore better alternatives for obtaining these services or resources if they exist.*
- 7.2.2 *State IT organization and structure is carefully reviewed as needed to ensure the state's information resources are being managed and deployed in the best way possible, and to affect changes necessary to meet new requirements and new environments.*

Current Technology Environment

SWOT Analysis

During the strategic planning process, a SWOT analysis was made of Utah's current information technology environment -- identifying its strengths, weaknesses, opportunities for improvement, and threats to future successes. The results of that analysis are included here:

Strengths: general citizenry and public-sector employees tend to be fairly fluent in technology; strong IT industry presence in state; well developed infrastructure-- state wide area network and UEN EdNet and UtahLink infrastructures for delivering technology to schools; effective e-mail and communication capability across state agencies; Utahn's seem willing to embrace technology; Governor supports, focuses on, and believes in the value of technology; statewide governance structure exists for IT-- CIO, ITPSC, UEN, IT Commission, etc.; agencies have autonomy to develop and deploy needed applications; overall competency of state IT personnel.

Weaknesses: sharing of information and expertise across departments needs to increase; our reputation sometimes exceeds the reality; need to create more examples of applications that demonstrate the Governor's vision for technology; difficult to keep pace with compensation requirements for IT workers; hard to attract and retain IT workers; lack of money for new IT projects; no common data definitions for information across state systems; little sharing of data or data tools across agencies, divisions, or departments; hard to freeze program processes long enough to design valuable applications; technology and programs sometimes seem on different tracks when it comes to funding; difficult to engage in sharing and joint development activities without stifling progress; lack of clarity between what IT activities and projects are best done centrally and which require central coordination and control; legislative process encourages competition for scarce IT resources; technical biases of IT staff; difficult for non-technical program directors to weigh risks and returns of technical recommendations; heavy reliance on consultants and outside contractors; lack of line staff support in some cases for statewide integration initiatives; stove-pipe funding makes it difficult to initiate horizontal or statewide IT initiatives; communication with public difficult when the project is not easily understood; perceived mis-alignment between what Governor says about IT and what departments say and do; too little IT training for both technical and non-technical state workers, not enough understanding by legislators about IT issues.

Opportunities: support rural Utah's strong desire to get connected; increase level of IT systems integration between agencies that serve common customers, correcting Year 2000 problems can also help modernize our IT resources; regular state control and oversight on projects; merge IT managers perspectives with program manager perspectives; develop and communicate priorities for IT initiatives across state, develop strategy for funding joint or statewide IT initiatives; persuade Executive Appropriations Committee to make IT a top priority;

Threats: Year 2000 problem; changing business environment-- departmental programs change rapidly; technology marketplace constantly in flux and moving rapidly; technology resources

become obsolete before they are fully implemented or used; risk of stifling creativity if too much central control is exerted; funding processes will drive toward separation rather than towards integration.

Key Issues for IT Management

In January 1998 the following were identified as key issues by IT management in the state. For each issue, we have listed the strategic goal or goals identified in this plan that addresses the issue.

Issue	Goal
Need better alignment between governor's priorities and messages and the funding being allocated to projects. Governor is touting certain initiatives as being important, and yet those same projects are starved for funding. Disconnect between governor's "vision" of role of IT in government and the legislature's view of IT's value and role is a real problem. Expectations vs. funding.	Goal 4
No overall strategic planning process for IT. Not much integration between IT planning and budget planning/funding processes. IT planning from departments and agencies is not necessarily aligned with governor's priorities or statewide initiatives.	Strategic Plan & Goal 4
Hiring/retention of IT personnel: difficulty in retaining our good IT people, and in hiring and attracting new IT people, especially in some roles such as LAN administrators and programmer/analysts.	Goal 6
The arbitrary "2%" limit being set by GOPB on new monies is limiting ability to schedule or fund worthwhile IT projects that would save state considerable money if implemented. There are obvious "wins"-- projects that would be cost-effective-- that we can't get funding to proceed with. Related issue: need to educate legislators about the infrastructure which must be in place to accomplish many of the IT initiatives-- increased FTE's to support new projects, wiring, hardware, etc.	Goal 4 and Goal 7
Year 2000 problem. Central coordination, status tracking, identifying interfaces. Issue of how to deal with the money that will be aside by legislature for addressing problems.	Goal 1
Need to be doing much more in area of standards and policies. Standardized architectures, hardware, software, and procurement reform would yield cost-savings. Lack of standards is creating barriers, making it difficult to share data, and promoting duplication of effort, training. This includes the issue of lack of standards in tools and methodology in application development.	Goal 3 and Goal 5
Data standardization: related to item above, probably even more important that we focus on data standards, how common data objects are represented, coordination with federal data standards efforts, etc.	Goal 5
Small IT departments, such as in DHRM, find it hard to support costs of worthwhile IT efforts that benefit other agencies state-wide. Would like to see some ability to share those costs across departments, agencies. Need to share the funding/support load for state-wide applications among all state agencies (FINET, HR Enterprise).	Goal 3 and Goal 4
Need to develop and follow an architecture for a seamless state wide-area network.	Goal 5
Desire for state intranet and a coordinated plan for intranets. This has been discussed in IT Manager's meeting and there was strong desire to see an intranet implemented for state employee use.	Goal 5, Goal 6
Telecommunications: policies and regulations, planning, oversight of service acquisition. UTCC and legislative proposals for oversight in this area tie into this issue.	Goal 5

Electronic delivery of government services, AccessUtah – we know <u>how</u> to do it, but is anyone willing to pay the price to actually get it done? Ownership, funding, process and management issues. Should CIO office be involved in “content” issues?	Goal 2
Community networks, SmartUTAH efforts– issues include: what is our role? How much should we be pushing on this? Need to tie into 21 st Century Cities initiative.	Goal 2
Electronic commerce needs backing and funding-- state needs to play a role in closing the loops and enabling e-commerce for the state. Digital signature law a good step, but other steps needed as well.	Goal 2
Privacy and confidentiality issues are very important. Need standardization on representation of data between various health care entities. Some standards being developed by federal government that we need to track. Privacy and confidentiality a paramount concern in the transmission and use of electronic health records.	Goal 3 and Goal 5
Need to somehow find ways to fund resources needed to enable telecommuting, especially in smaller departments. We have extolled the benefits, but many agencies can’t afford the resources required to enable it.	Goal 2 and Goal 4
Procurement: Need to do a better job of using our combined purchasing power. Should the CIO’s office be more involved in approving purchases? This is tied to the issue of standards	Goal 2, Goal 4, and Goal 7

Major Issues and Trends in Information Technology

The Gartner Group, in a report issued in its “Month Research Review, January 1, 1998, identified several key trends driving the evolution of information technology during the next few years. A summary of these trends follows:

“As the focus of IT moves from process-driven efficiency to user-driven effectiveness, several trends have emerged that will characterize the evolution of IT through 2002:

Trend 1: From Data to Decisions. Rather than using IT as a means to collect and present data for users to make decisions, technology will continue to automate more of the burden of the decision-making process itself (e.g., through expert systems, data mining and agents). This will make it easier for data to drive decisions.

Trend 2: From Communication to Collaboration. The widespread adoption of technology to promote collaboration in a way that makes geographic location irrelevant will continue. A major portion of this evolution will be tied to organizational and cultural shifts that encourage and reward collaboration, and to a mind-set that embraces collaboration as a means to create a finished product.

Trend 3: From Information to Knowledge. As the knowledge management trend hits IT and related industries with full force during 1998 to 1999, organizations will search out technologies that provide: integrated access to disparate information sources; intuitive “knowledge maps” to structure available information and human expertise; and technology environments that ease the capture and sharing of tacit (i.e., previously undocumented) knowledge.

Trend 4: From Network Computing to Ubiquitous Computing. Users already do not care where information is physically located (as on the Web) or which machine is actually processing the application (as in client/server or network computing).

Trend 5: From Graphical to Cognitive User Interfaces. Speech recognition, natural language processing, visualization and other advanced user interface technologies are moving computers toward more natural, cognitively attuned interfaces that capitalize on human communication and perceptual capabilities.” A natural voice interface will be available within two years; natural language database query capability will become common.

Other Important Information Technology Issues and Trends

1. Continuing **increase in communications bandwidth and processing power** will enable greater delivery flexibility and access by the public to information, using a broad range of communications devices.
2. User interfaces will continue to migrate towards the “**browser**” metaphor-- it won’t matter where the data is stored. The world will be accessible from your standard desktop user interface. The end user will require seamless access to the data, no matter whether it is local or on a connected network.
3. **Electronic commerce** will continue to grow quickly, as well as tools and enabling technology for it. Government services can use these same enablers to offer services electronically to citizens. Concerns about privacy and authentication will initially increase as the merits of various solutions are debated, then decrease as both public and private networks continue to implement appropriate security measures.
4. Intelligent, **personalized information access and retrieval** will be an area of focus and innovation. There has always been “too much information”, even before computers, now we just have access to more of it. The issue is making sure people can get quickly to what is relevant to them. The current “push” technology being implemented is a response to this desire for quicker access to what is relevant to the individual.
5. No one single device will be dominant-- **desktop PC’s** will continue to play a large role, although portable form-

factor computers (notebook/laptop computers) may dominate. Flatter, lighter, more powerful portable computers will be a significant growth area. **Network computers** (NC's) will not replace the desktop PC, although they will find a role, especially for forms-based data entry needs. Government and education may both find that network computer architecture is attractive for specific tasks, forms-driven applications, and educational environments where server-based applications and browser access is desirable. Smaller communications devices, such as telephones with computing and e-mail capabilities, will be important. Computing capability and "browser" type interfaces will be integrated into TV and telephone devices, allowing even more people to interact with the Internet, educational networks, and public services offered electronically. Internet and telecommunications devices will increasingly share capabilities – being able to make voice calls over the Internet, being able to browse from your "Internet phone", etc.

6. Infrastructure will move towards the **use of open, public networks** with appropriate encryption and authentication security measures, rather than promulgation of large private telecommunications networks for government use.
7. Technology does not transform government-- people do. Technology should bring government closer to the people, who will then transform government as needed. **Processes should be re-engineered** to improve the ability of government to reach the end-user (citizen) quickly, efficiently, and cheaply. IT can be an important driver for business re-engineering.
8. **Computer power will continue to double every 18 months** (Moore's Law) for at least 12 years and probably beyond that, particularly with potential innovations and developments in biotechnology and nano-technology.
9. **Love the Net or Die!** – Organizations and businesses without effective Internet intranet, and extranet strategies will literally cease to exist. If you employ proper security, the Internet can become a much cheaper pipe for information flow than current proprietary networks. Security architecture will become increasingly important and key as applications and information migrate to public networks.
10. **Changes in the workplace** – Entire job classes will see dramatic changes or will cease to exist-- in particular the ability for manufacturers to contact and interact directly with consumers will decrease the need for "middlemen" and "agents". Those intending to act as a broker or agent for goods or services will need to offer significant additional value to the consumer. Workers will have an increased ability to function and work from home, a mobile office, and other locations than the traditional office.
11. **Enterprise Licensing** will gradually replace per seat licensing as IT industry cultures shift from a client-server to a Web-based "world view."
12. **Progress in electronic delivery of government services** including automating electronic payments, contracting, and procurement reform may lag behind expectations not because of technical hurdles but because of cultural changes it will require.
13. **Shared data initiatives will proliferate** including the use of data warehousing, data transformation and extraction, data mining and consolidation.
14. **Highly integrated off-the-shelf object oriented pre-packaged applications** using shared modules and templates will become the norm. The trend will be away from creating code and towards assembling and integrating objects and solutions.
15. **Distributed enterprise systems**, client server applications, enterprise directory management, enterprise management systems will make information technology management more cost efficient.

Vision of the Future

The following scenarios help to describe the kind of technology-enabled government that the strategic plan hopes to direct us toward. They are intended only to help describe what is possible.

Scenario 1

It is a warm summer evening. Rick and Debbie Carlton are relaxing on the shaded porch of their rental cottage at Zion's National Park. After hiking all morning and also most of the afternoon along some of the park's nature trails, Rick is feeling exhausted, and ready to fall into bed. The nagging headache that began pulsing this morning when the sun came out has escalated to a continuous and painful drumbeat inside his head. Within a couple of hours, Rick is feeling extremely short of breath. Struggling to get enough air, he awakes Debbie. Together they walk to the lobby of the guest hotel near the cottage. The clerk directs them to a small medical clinic within the park. It is about 10-minute drive from the hotel. Meanwhile, Rick continues to feel worse. At the clinic, the technician leads them to a kiosk in their diagnosis room where he quickly connects the necessary probes to Rick. While the computer-kiosk instruments take his temperature, blood pressure, and pulse. Debbie swipes Rick's digital medical information card through a card reader on the machine which instantly connects them to his medical information stored in their physician's home office in Sandy. Recognizing that Rick's condition requires some expertise, the technician at the clinic, types in a few key words and sends a request for a medical consultation. Their primary care physician is not in the office but his office phone computer system automatically forwards the request to his home in Draper. The doctor, who is just getting ready for bed, answers the page by logging on to the computer in his office. Information about Rick's medical history and updated vital statistics from the kiosk at the clinic have already been uploaded and are immediately presented to the doctor. The doctor asks Rick some additional questions over a two-way video connection between his office and the Zion's medical clinic. The doctor concludes: "We're going to need an x-ray of Rick's lungs, and I'd like to consult with a respiratory specialist at the University of Utah Hospital." The clinic technician pulls out a sliding panel from the side of the kiosk. A movable arm with camera attached, allows him to position Rick and take an x-ray of his lungs. The digitized image is immediately transmitted to the doctor's home computer and simultaneously to the specialist at the hospital. After a few minutes of study the specialist dictates the results of his x-ray analysis, which are electronically transcribed and attached to a copy of the image in the hospital's files. The specialist and the doctor agree on a diagnosis. He immediately discusses his findings with Rick, Debbie, and the technician via the video connection. "You have an attack of acute asthma," the doctor explains. You're going to be fine, but it is serious and we need to get you to a hospital for observation." He then prescribes some initial medication while the technician, arranges for transportation to St. George. The kiosk, with the information available from Rick's medical information card, automatically sends billing information to the primary insurance provider, and prints Rick and Debbie a copy for their records or allows them to store an electronic copy on the medical card.

This is but one example of how having instant electronic access can uncover vital information which may have been difficult or impossible to obtain otherwise. Also, several hours have been saved by the immediate communication and transfer of information and expertise – hours that can mean the difference between life and death for a patient with a serious medical condition.

Scenario 2

Heather Ericsson had good reason to feel happy. She was only two tests away from completing her bachelor's degree in financial planning. Her long awaited achievement had not been without struggle. Two years of juggling to balance school work, a part-time job at Wal-Mart, and the demands of being a single parent to her 3 year-old son was not, as her farmer's wife great grandmother always said, an "easy row to hoe." But Heather's parents had been very supportive, allowing her to continue to live at home while she worked and studied. She was also equally fortunate to have been given the chance to take many of her classes over the Internet from the computer in her parent's home. Even though the local college did not offer a degree in her selected area of study, she had been able to take on-line courses from several universities and colleges, including part of one course taught by a professor in Seattle.

This evening, like many others, she returns home after her discussion group. Six other students who are also enrolled in the same on-line course, had just met at a nearby high school, to complete one of their financial planning assignments. Sitting at the home computer, she quickly logs on to the course web site, checks for any e-mail from the instructor, and posts the group's completed assignment on the web site for review by the instructor .

The next morning, after getting the baby dressed and fed, Heather turns on her computer and orally requests any information available for jobs in Davis County in the financial industry. The search returns three matches that seem relevant. Two companies offer employment counseling and help in finding a job, but they charge a fee which Heather knows she can't afford. The third is a free service offered by the state's Department of Workforce Services. She asks for that selection and the computer connects her to their home page. She soon discovers she can browse the posted jobs by asking for any jobs in financial planning that are located in Farmington, with a salary of more than \$20,000 a year. She also realizes there are no current job openings that match the description, but for a small fee, she can have her resume sent to the human resource directors at each of the banks, brokerages and financial institutions located in Davis County. She learns she can "sign up" for the service which is secure and protects her confidentiality. She agrees to have the service deduct the fee from her "web account." Each month Heather puts an amount deducted from her regular bank account in her electronic account to be used for web-based transactions. An electronic form is presented for her to enter her resume information. Instead, she selects the option to have the form extract information from a resume document she has used before. She selects the file on her computer, and software at the department automatically extracts information from her resume that matches that requested by the form— name, address, employment history, etc. There are six items on the form that are not found and cannot be extracted from her resume. She fills in the blanks by speaking her answers to each question into her computer's microphone. Her answers are then presented to the department's web server for entry into the database. She also selects the option to her information automatically sent to employers as they post new positions with the department that match her needs. She logs off and prepares to go to work. The department's web server then transmits the electronic form and sends it as an e-mail attachment with a notice to the human resource directors at each of the financial institutions in Davis County that have registered for that service with the state's job search on-line service bureau. Each company has paid a monthly fee to the state to receive these updates on prospective employees. When she returns home at 8:00pm she has a note from her dad that a local branch of Wasatch Advisors has called and wants her to come in for an interview at 10:00 a.m. the next morning. With unabashed excitement, she tells her dad: "Maybe I can finally make a deposit on my own apartment!" Her dad smiles and winks: "I'll miss ya honey, but then again your old bedroom sure would make a nice home office."

Scenario 3

Jose Montenegro stopped to pick up a doughnut for breakfast and a copy of USA Today at the pastry shop just outside the light rail station in West Jordan. He parked in the commuter lot with still a few minutes to spare before the 7:35 train left for downtown Salt Lake City. He pulled his rail rider pass card out of his pocket and held it momentarily in front of the entry gate. The green entry light blinked and the bar swung back letting Jose step forward and onto the train. The pass card automatically signaled the ticket authorization software which logged another ride to Jose's account. Each month, funds are automatically transferred from his checking to an account held by commuter rail line. Jose figures this saves him about an hour a month and eliminates one big pain from his life -- standing in to pay the fare each day. Now if only Smith Tix would add a few more kiosks in his neighborhood to handle those huge stadium concerts and the movies theaters would allow him to print his tickets off his printer at home he could almost get out of standing in line all together. Maybe someday, Jose mused.

During the ride into work Jose slips on his digital earpiece and uses his cellular pocket computer/phone to dial in to the Department of Commerce's Intranet. As an inspector in the state's business licensing division he finds it convenient to be able to log into the state network no matter where he is -- Some days he visits as many as 4-5 businesses to conduct annual inspections or follow up on consumer complaints. His division posts daily Intranet briefings about new assignments, policies, or events. His specialized search program scans and downloads those pieces of information which directly pertain to him. As he taps on the computer screen, a custom web page built automatically for him on the department web site is created for future viewing. Relevant information is synthesized into speech and transmitted wirelessly to his earpiece by an efficient yet pleasing voice simulation, affectionately referred to as "Carmen." "Good morning Jose," says Carmen brightly. "Just a reminder, that all division employees are invited to join a computer-based training session at 1:00pm today via the state's on-line training center. Learn how to take advantage of video-conferencing to reduce travel time while assisting our Division of Air Quality in meeting their latest targets." Jose looked up when he heard the swish of the train door opening. "The problem of all these new gadgets," grumbled Jose, "is while I'm getting so informed I almost missed my stop!"

After arriving at his office building, and settling in at his desk, Jose gives a spoken command to his desk computer/phone to call a small financial services firm on Foothill Drive. Apparently, several elderly folks from a nearby retirement home had posted complaints about the business to the department's consumer affairs site on the Internet. After some initial conversation with the company's vice-president, they switched to a virtual meeting room on the net, where they had the ability to post files, share documents, and see each other face-to-face. Jose explained the dilemma while clicking on two different complaint messages to allow the executive on the other end to read them on-line. The businessman was anxious to help eliminate any concerns, and they discussed in more detail some of the company's efforts to bring the income stream up to the level expected by the retirees.

As Jose walks, toward his evening rail stop, he checks the voice mail from his web page: "I thought is was a joke when they said I would be wearing my computer someday." An ironic grin flashes across Jose's face as he ponders: "I wonder if PEHP will pay for my new chip implants too?"

Scenario 4

Capt. John Kimball studied the information on the laptop computer screen in his police cruiser. As a member of the department's advisory board on munitions, Kimball is responsible to help select the best possible weapons and ammunition for the West Valley City police force. Through the laptop in his car, he connects to the state on-line mall for government purchasing and browses through the electronic catalogs from various vendors— comparing specs, looking at pictures of the various types of handguns, and reading up on reports about weapons used by other police departments around the country. He book marks this particular catalog so it will be readily accessible the next time he is looking, and tells the computer to request a quote from the vendor for 27 units of the Smith and Wesson model.. The quote is generated by the vendor, and automatically forwarded to John and the rest of the advisory board members, as well as to similar buyers who work for other law enforcement agencies throughout the state. If he later approves the purchase it will be paid for via electronic funds transfer from the department's financial account.

As he finishes, the voice of the dispatch officer breaks in, over the same secure wireless channel being used for connecting his laptop to the state law enforcement net, and indicates "a code 57" near where he is parked. He responds verbally to the call, and a Global Positioning Satellite signal from his police cruiser tracks his car on a map on the dispatch officer's screen back at the headquarters. He drives quickly to the address provided— both in verbal and written form on his computer screen. His adrenalin rises as he realizes he is entering one of the most dangerous situations an officer encounters, a domestic violence incident . While Captain Kimball is en route, the address of the disturbance is immediately routed to the state directory services, where a search locates the name of the registered homeowner at that address, and relays it simultaneously to the dispatch office and the captain. By the time Capt. Kimball arrives at the scene, a search of national, state, and local criminal justice databases yields a digitized police photo of the father of the household, a record of his criminal history, and an outstanding warrant for the man's arrest for failure to appear in court on a previous abuse charge complete, with digital signature from the courts. The time saved, and the additional information, allows Capt. Kimball to more effectively help this family while better protecting himself and his fellow officers.